David Kirby

Course ID: ECE 495/595 Network Economics-Spring

Prof. Eirini Eleni Tsiropoulou, eirini@unm.edu / (505) – 277 – 5501
326B/ Office Hours: Tuesdays and Thursdays 2:00pm-3:00pm
Lectures: Tuesdays and Thursdays 5:30pm-6:45pm, Room: EECE 210
Department of Electrical and Computer Engineering / University of New Mexico

Mid Term Exam (30%)

1. The end user is the ultimate consumer of applications, data, and services on a computing platform.

True / False

2. A(n) _____ is an organization that delivers communications services over a typically large geographic area and provides, maintains, and manages network equipment and networks.
A) Application service provider
B) Content provider
C) Network provider
D) Application provider

3. _____ comprise a typical network hierarchy. (Choose all correct answers.)
A) Access networks
B) Peering networks
C) Distribution networks
D) Core networks

4. _____ is the commercial name for a wired local-area network technology.
A) Wi-Fi
B) Ethernet
C) IoT

5. A combination of Ethernet and Wi-Fi is currently the most common architecture found in the office environment.

True / False

6. _____ is a committee of the Institute of Electrical and Electronics Engineers responsible for developing standards for wireless LANs.
A) The Ethernet Alliance
B) IEEE 802
C) NIST
D) IETF

7. Products do not need to be certified by the Wi-Fi Alliance to be designated as Wi-Fi.

True / False

8. The objective of the _____ of wireless communication is to provide fairly high-speed wireless communications to support multimedia, data, and video in addition to voice.
A) First generation (1G)
B) Second generation (2G)
C) Third generation (3G)
D) Fourth generation (4G)
E) Fifth generation (5G)

9. Broad network access, rapid elasticity, measured service, on-demand self-service, and resource pooling are defined by NIST as the essential characteristics of _____.

A) IoT
B) Wi-Fi
C) Ethernet
D) Cloud computing

10. A dominant theme of the _____ is the embedding of short-range mobile transceivers into a wide array of gadgets and everyday items, enabling new forms of communication between people and things, and between things themselves.
A) IEEE 802
B) Internet of Things
C) Sensor/actuator technology
D) Network convergence

11. The IoT is a massive system consisting of seven layers, all of which are essential to an effective use of the IoT concept.

True / False

12. _____ is the provision of telephone, video, and data communication services within a single network.
A) Enterprise services
B) Cloud computing
C) Network convergence
D) Operational technology

13. An example of application convergence is multimedia messaging.

True / False

14. Three key benefits of IP network convergence are cost savings, effectiveness, and transformation.

True / False

15. Traffic on the Internet and enterprise networks can be divided into two broad categories: elastic and inelastic.

True / False

16. _____ traffic can adjust, over wide ranges, to changes in delay and throughput across an internet and still meet the needs of its applications.
A) Cloud
B) Elastic
C) Real-time
D) Inelastic

17. _____ traffic does not easily adapt, if at all, to changes in delay and throughput across an internet.
A) Cloud
B) Elastic
C) Real-time
D) Inelastic

18. _____ is the variation in delay associated with the transfer of packets between two points, and is typically measured as the maximum variation in delay experienced by packets in a single session.
A) Throughput
B) Latency
C) Delay jitter

19. Cloud computing refers to everything that enables an organization to create, manipulate, and manage very large data sets and the facilities in which these are stored.

True / False

20. Big data refers to the _____ of structured and unstructured data pouring through networks into processors and storage devices, along with the conversion of such data into business advice for enterprises. (Choose all correct answers.)
A) Variety/variability
B) Velocity
C) Virtualization
D) Volume

21. The three categories of mobile traffic are _____. (Choose three correct answers.)
A) Mobile data traffic
B) Internet traffic
C) PLC traffic
D) Managed IP traffic

22. _____ is the measurable end-to-end performance properties of a network service that can be guaranteed in advance by a service level agreement between a user and a service provider, so as to satisfy specific customer application requirements.
A) IoT
B) QoE
C) PoE
D) QoS

23. _____ is a network that is administered by a single set of management rules that are controlled by one person, group, or organization.
A) IRP
B) Autonomous system
C) Software-defined network
D) ERP

24. _____ is an approach to designing, building and operating large-scale networks based on programming the forwarding decisions in routers and switches via software from a central server.
A) IRP
B) ERP
C) SDN
D) NFV

25. _____ is the virtualization of network functions by implementing these functions in software and running them on virtual machines.
A) IRP
B) ERP
C) SDN
D) NFV

26. The traditional internetworking approach is based on the TCP/IP protocol architecture.

True / False

27. The TCP/IP protocol architecture consists of _____ layers.
A) 3
B) 4
C) 5
D) 6

28. A method of transmitting messages through a communications network in which long messages are subdivided into short packets is _____.

A) Packet switching
B) Representational State Transfer
C) Service function chaining
D) Northbound API

29. A _____ is a unit of data sent across a network.
A) Throughput
B) Packet
C) Datagram
D) Flow

30. _____ is a sequence of packets between a source and destination that are recognized by the network as related and are treated in a uniform fashion.
A) Packet
B) Throughput
C) Datagram
D) Flow

31. _____ is a language and message format used by an application program to communicate with the operating system or some other control program such as a database management system or communications protocol.
A) Application programming interface
B) Datagram
C) IoT
D) TCP/IP architecture

32. Standards are documents that provide requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that materials, products, processes, and services are fit for their purpose.

True / False

33. Unlike some technology areas, such as Wi-Fi, there is no single standards body responsible for developing open standards for SDN and NFV.

True / False

34. RFC is the coordinating committee for Internet design, engineering, and management.

True / False

35. The SDN data plane is where network forwarding devices perform the transport and processing of data according to decisions made by the SDN control plane.
True / False

36. The data forwarding function interacts with the SDN control layer to support programmability via resource-control interfaces.

True / False

37. _____ accepts incoming data flows from other network devices and end systems and forwards them along the data forwarding paths that have been computed and established according to the rules defined by the SDN applications.
A) Control support function
B) Northbound API
C) Data forwarding function
D) Service function chaining

38. A flow is a sequence of packets traversing a network that share a set of header field values.

True / False

39. The OpenFlow protocol describes message exchanges that take place between an OpenFlow controller and an OpenFlow switch.

True / False

40. The OpenFlow protocol supports _____ messages. (Choose all correct answers.)
A) Asynchronous
B) Symmetric
C) Indirect
D) Controller to switch

41. The OpenFlow protocol provides the SDN controller with which types of information to be used in managing the network? (Choose all correct answers.)
A) Encapsulated packets
B) Flow statistics
C) Event-based messages
D) Action bucket

42. The southbound interface provides a uniform means for application developers and network managers to access SDN services and perform network management tasks.

True / False

43. The northbound interface enables applications to access control plane functions and services without needing to know the details of the underlying network switches.

True / False

44. The routing function comprises a protocol for collecting information about the topology and traffic conditions of the network and an algorithm for designing routes through the network.

True / False

45. The _____ maintains the topology information for the network and calculates routes in the network.
A) Application layer
B) Topology manager
C) Link discovery
D) Resource layer

46. _____ is a sublayer of the SDN control layer. (Choose all correct answers.)
A) Abstraction
B) Orchestration
C) Control support
D) Application support

47. The _____ layer of **OpenDaylight** consists of business and network logic applications that control and monitor network behavior.
A) Network applications, orchestration, and services
B) APIs
C) Controller functions and services
D) Service abstraction layer (SAL)
E) Southbound interfaces and protocols

48. REpresentational State Transfer (REST) is an architectural style used to define APIs.
True / False

49. In addition to northbound and southbound interfaces, a typical SDN controller will have an

east/westbound interface that enables communication with other SDN controllers and other networks.

True / False

50. An abstraction layer is a mechanism that translates a high-level request into the low-level commands required to perform the request.

True / False

51. The _____ module examines violation events and, depending on event type, either automatically invokes the policy enforcer or sends an action request to the network manager.
A) Traffic monitor
B) Policy checker
C) Event handler
D) Topology manager

52. The OpenFlow API is an example of a _____ abstraction.
A) Distribution
B) Specification
C) Network
D) Forwarding

53. _____ is a method for dynamically analyzing, regulating, and predicting the behavior of data flowing in networks with the aim of performance optimization to meet service level agreements.
A) PolicyCop
B) Traffic engineering
C) Routing
D) Event handling

54. A(n) _____ is an attack in which multiple systems are used to flood servers or network devices or links with traffic in an attempt to overwhelm its available resources, making it unavailable to respond to legitimate users.
A) DDoS
B) DoS
C) ODC

55. With information-centric networking (ICN), a distinction exists between location and identity.

True / False

56. Two key tools in measuring the network performance that an enterprise desires to achieve are quality of service (QoS) and quality of experience (QoE).

True / False

57. A(n) _____ typically represents the agreement between a customer and a provider of a service that specifies the level of availability, serviceability, performance, operation, or other attributes of the service.
A) Resource reservation
B) Policy
C) SLA
D) Queue management

58. The key elements of the guaranteed service are which of the following? (Choose all correct answers.)
A) The service provides assured capacity, or data rate.
B) There is a specified upper bound on the queuing delay through the network.
C) There are no queuing losses.

D) The service tightly approximates the behavior visible to applications receiving best effort service under unloaded conditions.

59. DiffServ is the most widely accepted QoS mechanism in enterprise networks.

True / False

60. Elastic traffic is network traffic that is tolerant to variations in delay, jitter, and throughput.

True / False

61. _____ is a subjective measure of performance in a system and relies on human opinion.
A) QUALINET
B) PDU
C) QoE
D) QoS

62. _____ is the resulting verdict produced by a user after he/she has carried a "comparison and judgment" process of an observable occurrence or event.
A) Experience
B) Reflection
C) Description
D) Quality

63. _____ is an individual's description of a stream of perceptions, and his/her interpretation of one or multiple events.
A) Experience
B) Reflection
C) Description
D) Quality

64. Perception is the mental processes of perception, memory, judgment and reasoning.

True / False

65. An event is an observable occurrence.

True / False

66. Network-level QoS is concerned with the low-level network parameters such as service coverage, bandwidth, delay, throughput, and packet loss.
True / False

67. User demographics, usability, cost, content, and media quality are all key contributing factors to producing a good QoE.

True / False

68. For _____ assessment of QoE, experiments are carefully designed to a high level of control (such as in a controlled laboratory, field tests, or crowdsourcing environments) so that the validity and reliability of the results can be trusted.
A) Subjective
B) Objective
C) Cognitive
D) Analytical

69. For _____ assessment of QoE, computational algorithms provide estimates of audio, video, and audiovisual quality as perceived by the user.
A) Subjective

B) Objective
C) Cognitive
D) Analytical

70. The mean opinion score (MOS) is a standard metric for QoE.

True / False

71. End-user device analytics is a method of QoE measurement.

True / False

72. Categories of QoS mapping models include which of the following? (Choose all correct answers.)
A) Black-box media-based models
B) White-box media-based models
C) Glass-box parameter-based models
D) Gray-box parameter-based models

73. _____ quality models rely on the analysis of media gathered at system entrance and exit.
A) Black-box media-based
B) White-box media-based
C) Glass-box parameter-based
D) Gray-box parameter-based

74. The main advantage of _____ quality models resides in their ability to measure QoE values using information gathered at the periphery of a given media processing system.
A) Glass-box
B) Gray-box
C) Black-box
D) Red-box

75. The _____ quality models quantify the QoE of a given service through the full characterization of the underlying transport network and edge devices.
A) Black-box media-based
B) White-box media-based
C) Glass-box parameter-based
D) Gray-box parameter-based

76. The network layer QoS/QoE mapping models rely solely on QoS metrics gathered from the TCP/IP stack.

True / False

77. _____ is a measure of QoE that may be used to undertake decisions.
A) KPI QoE
B) Network-centric QoE
C) Actionable QoE

78. The service-oriented actionable QoE solutions account for QoE measures within the delivery infrastructure.

True / False

79. The signal-to-noise ratio is a good indicator of quality of service, especially over wireless telecom networks.

True / False

80. A high packet loss rate indicates that users sustain undoubtedly a very poor quality.

True / False

81. An increasing delay jitter is a good indicator of poor quality.

True / False

82. A big advantage to using cloud computing to store your data and share it with others is that cloud providers do not have security failures.

True / False

83. The Internet is the only piece of networking infrastructure that you need for cloud computing.

True / False

84. Cloud storage is a subset of cloud computing that consists of database storage and database applications hosted remotely on cloud servers.

True / False

85. _____ is a group of capabilities offered via cloud computing in which the cloud service customer can use the cloud service provider's applications.
A) PaaS
B) IaaS
C) CaaS
D) SaaS

86. _____ is a group of capabilities offered via cloud computing in which the cloud service customer can deploy, manage, and run customer-created or customer-acquired applications using one or more programming languages and one or more supported execution environments by the cloud service provider.
A) NaaS
B) PaaS
C) SaaS
D) CaaS

87. PaaS is an operating system in the cloud.

True / False

88. _____ is a group of capabilities offered via cloud computing in which the cloud service customer can provision and use processing, storage, or networking resources.
A) PaaS
B) Iaas
C) SaaS
D) CompaaS

89. A cloud service category can include capabilities from one or more cloud capability types.

True / False

90. The _____ infrastructure is a composition of two or more clouds that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.
A) Private cloud
B) Public cloud
C) Community cloud
D) Hybrid cloud

91. Cloud service management includes all the service-related functions necessary for the management and operation of those services required by or proposed to cloud consumers.

True / False

92. Security and privacy are concerns that encompass all layers and elements of the cloud provider's architecture.

True / False

93. Wireless developments are crucial to the growth of IoT.

True / False

94. _____ is a global infrastructure for the information society, enabling advanced services by interconnecting physical and virtual things based on existing and evolving interoperable information and communication technologies.
A) COTS computing
B) Internet of Things
C) Cloud computing
D) SLA

95. With regard to the IoT, a(n) _____ is an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks.
A) Thing
B) Device
C) Actuator
D) Component

96. With regard to the IoT, a(n) _____ is a piece of equipment with the mandatory capabilities of communication and the optional capabilities of sensing, data capture data storage, and data processing.
A) Thing
B) Device
C) Actuator
D) Component

97. The key ingredients of an IoT-enabled thing are sensors, actuators, a microcontroller, a means of communication, and a means of identification.

True / False

98. A(n) _____ is a device that converts a physical, biological, or chemical parameter into an electrical signal.
A) Actuator
B) Converter
C) Tag
D) Sensor

99. _____ is the closeness of agreement between the result of a measurement and the true value of the measurand.
A) Precision
B) Sensor
C) Accuracy
D) Resolution

100. _____ is the degree of agreement of repeated measurements of the same property, expressed quantitatively as the standard deviation computed from the results of the series of measurements.

A) Precision
B) Sensor
C) Accuracy
D) Resolution

101. Precision refers to how close multiple measurements of the same physical quantity are to each other.

True / False

102. QoS without QoE is not sufficient to provide adequate service to the user for multimedia applications.

True / False

103. A choke packet is a control packet generated at a congested node and transmitted back to a source node to restrict traffic flow.

True / False

104. Which of the following is a congestion control technique? (Choose all correct answers.)
A) Backpressure
B) Choke packet
C) Implicit congestion signaling
D) Network functions virtualization

105. What are the four general limitations of traditional network architectures cited by the Open Networking Foundation? (Choose four correct answers.)
A) Static, complex architecture
B) Inconsistent policies
C) Maintainability
D) Inability to scale
E) Mobility
F) Vendor dependence

106. _____ is an industry consortium dedicated to the promotion and adoption of SDN through open standard development.
A) ONF
B) ITU-T
C) ODCA
D) ETSI

107. _____ is a consortium of leading IT organizations developing interoperable solutions and services for cloud computing.
A) ONF
B) ITU-T
C) ODCA
D) ETSI

108. _____ is a United Nations agency that produces recommendations with a view to standardizing telecommunication on a worldwide basis.
A) ODCA
B) ITU-T
C) ETSI
D) ONF

109. _____ is a EU-sponsored standards organization that produces globally applicable standards for information and communications technologies.

A) ODCA
B) ITU-T
C) ETSI
D) ONF

110. The OpenFlow channel is the interface between an Open/Flow switch and an OpenFlow controller, and is used by the controller to manage the switch.

True / False

111. An _____ is where packets enter and exit the OpenFlow pipeline.
A) OpenFlow port
B) OpenFlow switch
C) OpenFlow channel
D) OpenFlow reserve

112. What are the three types of tables in the logical switch architecture as defined by the OpenFlow specification? (Choose all correct answers.)
A) Flow table
B) Group table
C) Meter table
D) Data table

113. The basic building block of the logical switch architecture is the group table.

True / False

114. The OpenFlow protocol enables the controller to manage the logical structure of a switch with regard to the details of how the switch implements the OpenFlow logical architecture.

True / False

115. Each group table consists of a number of rows, consisting of four components: group identifier, group type, counters, and action buckets.

True / False

116. The SDN application layer maps control layer service requests into specific commands and directives to data plane switches and supplies applications with information about data plane topology and activity.

True / False

117. The two categories of routing protocols are interior router protocols (IRPs) and exterior router protocols (ERPs).

True / False

118. Data transport and processing and control support are sublayers of the resource layer.

True / False

119. _____ is a generic term for a protocol that distributes routing information to collaborating routers that connect autonomous systems.
A) Neighbor acquisition
B) Interior router protocol
C) Exterior router protocol
D) Neighbor reachability

120. The application plane contains applications and services that define, monitor, and control network resources and behavior.

True / False

Good Luck! 😊 😊 😊